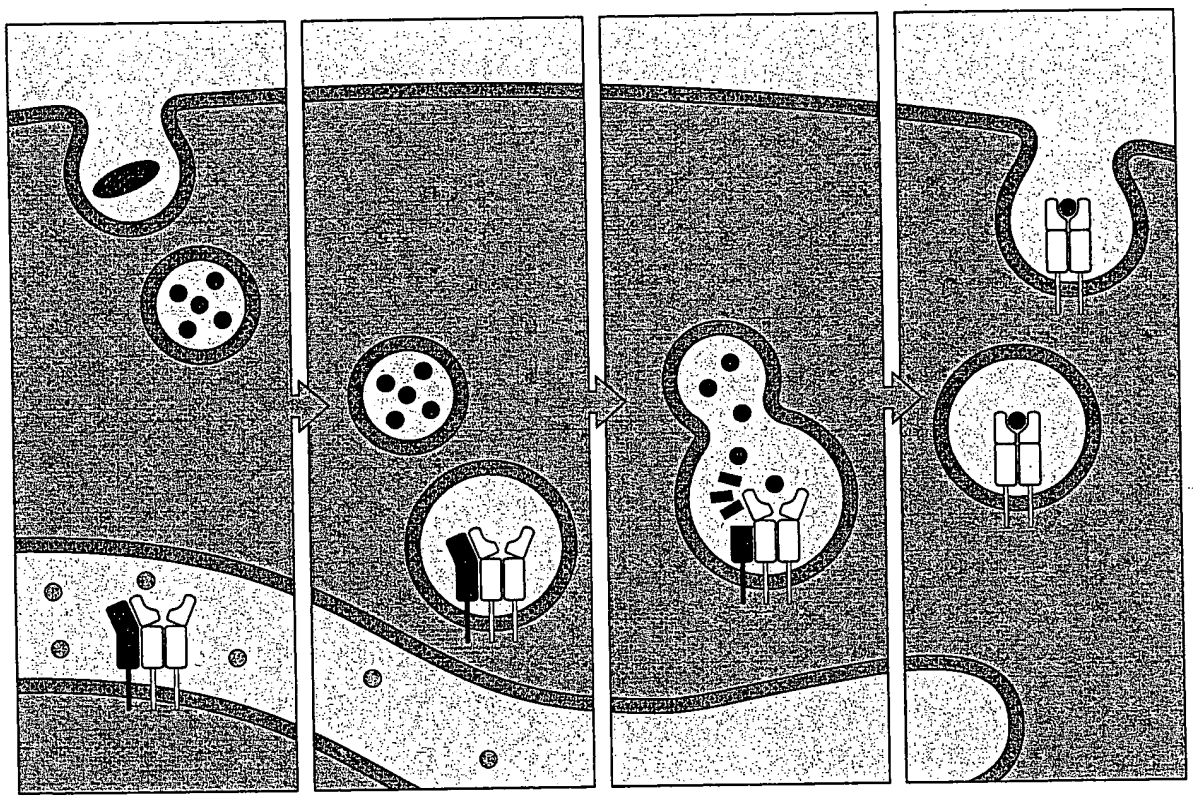
IMMUNOBIOLOGY

THE IMMUNE SYSTEM IN HEALTH AND DISEASE



JANEWAY - TRAVERS

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THE IMMUNE SYSTEM IN HEALTH AND DISEASE

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CB
CURRENT
BIOLOGY
LIMITED

Current Biology Ltd
London, San Francisco and Philadelphia

Garland Publishing Inc
New York and London

Principal text editor: Miranda Robertson
Text editors: Rebecca Ward, Eleanor Lawrence
Project editor: Rebecca Palmer
Assistant project editor: Emma Dorey
Principal designer and illustrator: Celia Welcomme
Designer: Sylvia Purnell
Assistant Illustrator: Matthew McClements
Production: Rebecca Spencer
Graphics software support: Gary Brown
Proofreader: Melanie Paton
Indexer: Nina Boyd
Photo research: Doug McGaughy, Tamsin Newmark

Distributors
Inside North America: Garland Publishing Inc., 717 Fifth Avenue, New York, NY 10022, USA.
Inside Japan: Nankodo Co. Ltd., 42-6, Hongo 3-Chome, Bunkyo-ku, Tokyo 113, Japan.
Outside North America and Japan: Blackwell Scientific Publications, Osney Mead, Oxford OX2 0EL. Orders to: Marston Book Services Ltd, PO Box 87, Oxford OX2 0DT, UK.
Australia: Blackwell Scientific Publications Pty Ltd., 54 University Street, Carlton, Victoria 3053.

ISBN 0-8153-1497-3 (hardcover) Garland
ISBN 0-8153-1691-7 (paperback) Garland
ISBN 0-86542-811-5 (paperback) Blackwell

A catalog record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data
Janeway, Charles.
Immunobiology: the immune system in health and disease/ Charles A. Janeway, Jr., Paul Travers.
p. cm.
Includes bibliographical references and index.
ISBN 0-8153-1497-3 (hardcover). ISBN 0-8153-1691-7 (pbk.).
1. Immune System. 2. Immunity. I. Travers, Paul, 1956- . II. Title
[DNLM: 1. Immune System--physiology. 2. Immune System--physiopathology. 3. Immunity--physiology. 4. Immunotherapy. QW 504 1994]
QR181.J37 1994
616. 07'9--dc20
DNLM/DLC
for Library of Congress 94-11058
CIP

This book was produced using Ventura Publisher 4.1 and CorelDraw 3.0.

Printed in Hong Kong by Paramount Printing Co. Ltd.

Published by Current Biology Ltd., Middlesex House, 34-42 Cleveland Street, London W1P 5FB, UK and Garland Publishing Inc., 717 Fifth Avenue, New York, NY 10022, USA.

the adjacent gene segment, being generated from a hairpin intermediate during recombination, and hence are called palindromic or P-nucleotides.

Poison ivy is a plant whose leaves contain pentadecacatechol, a potent contact sensitizing agent and a frequent cause of contact hypersensitivity.

Antigen activates specific lymphocytes while all mitogens, by definition, activate most or all lymphocytes, a process known as **polyclonal activation** because it involves multiple clones of diverse specificity. Such mitogens are known as **polyclonal mitogens**.

The major histocompatibility complex is both **polygenic**, containing several loci encoding proteins of identical function, and **polymorphic**, having multiple alleles at each locus.

The **poly-Ig receptor** binds polymeric immunoglobulins, especially IgA, at the basolateral membrane of epithelia and transports them across the cell where they are released from the apical surface. This transcytotic process transfers IgA from its site of synthesis to its site of action at epithelial surfaces.

The **polymerase chain reaction (PCR)** is a technique for amplifying a specific sequence in DNA by repeated cycles of synthesis driven by pairs of reciprocally oriented primers.

Polymorphism literally means existing in a variety of different shapes. Genetic polymorphism is variability at a gene locus that is not simply the result of random mutational events. The major histocompatibility complex is the most polymorphic gene cluster known in humans.

Polymorphonuclear leukocytes are white blood cells with multilobed nuclei and cytoplasmic granules. There are three types of polymorphonuclear leukocytes, the neutrophils with granules that stain with neutral dyes, the eosinophils with granules that stain with eosin, and the basophils with granules that stain with basic dyes.

Some antibodies show **polyspecificity**, the ability to bind to many different antigens.

Only those developing T cells whose receptors can recognize antigens presented by self MHC molecules can mature in the thymus, a process known as **positive selection**. All other developing T cells die before reaching maturity.

During B-cell development, **pre-B cells** are cells that have rearranged their heavy-chain genes but not their light-chain genes.

The **precipitin reaction** was the first quantitative technique for measuring antibody production. The amount of antibody is determined from the amount of precipitate obtained with a fixed amount of antigen. The precipitin reaction also can be used to define antigen valence and zones of antibody or antigen excess in mixtures of antigen and antibody.

Prednisone is a synthetic steroid with potent anti-inflammatory and immunosuppressive activity used in treating acute graft rejection and autoimmune disease.

During T-dependent antibody responses, a **primary focus** of B-cell activation forms in the vicinity of the margin between T and B cell areas of lymphoid tissue. Here, the T and B cells interact and B cells can differentiate directly into antibody-forming cells or migrate to lymphoid follicles for further proliferation and differentiation.

Lymphoid tissues contain lymphoid follicles made up of follicular dendritic cells and B lymphocytes. The **primary follicles** contain resting B lymphocytes and are the site at which germinal centers form when they are entered by activated B cells, forming **secondary follicles**.

The **primary immune response** is the adaptive immune response to an initial exposure to antigen. **Primary immunization**, also known as **priming**, generates both the primary immune response and immunological memory.

The binding of antibody molecules to antigen is called a **primary interaction**, as distinct from **secondary interactions** in which binding is detected by some associated change such as precipitation of soluble antigen or agglutination of particulate antigen.

During B-cell development **pro-B cells** are cells that have displayed B-cell surface marker proteins but have not yet completed heavy-chain gene rearrangement. They are divided into **early pro-B cells** and **late pro-B cells**.

Professional antigen-presenting cells or **APCs** are cells that normally initiate the responses of naive T cells to antigen. To date, only dendritic cells, macrophages, and B cells have been shown to have this capacity. A professional antigen-presenting cell must be able to display peptide fragments of antigen on appropriate MHC molecules and also have co-stimulatory molecules on its surface.

Programmed cell death or **apoptosis** is cell death triggered from within the dying cell. Apoptosis eliminates developing T cells that fail positive or negative selection, excess effector cells, and mature lymphocytes that do not encounter antigen. It plays a critical role in maintaining the numbers of lymphocytes at appropriate levels.

Properdin, or factor P, is a positive regulatory component of the alternative pathway of complement activation. It acts by stabilizing the C3/C5 convertase of the alternative factor (comprising C3b,Bb) on the surface of bacterial cells.

Cytosolic proteins are degraded by a large catalytic multisubunit protease called a **proteasome**. It is thought that peptides that are presented by MHC class I molecules are generated by the action of proteasomes, and two subunits of some proteasomes are encoded in the MHC.

Protective immunity is the resistance to specific infection that follows infection or vaccination.

Protein A is a cell membrane component of *Staphylococcus aureus* which binds to the Fc region of IgG, and is thought to protect the bacteria from IgG antibodies by inhibiting their interactions with complement and Fc receptors. It is useful for purifying IgG antibodies.

Enzymes that add phosphate groups to tyrosine residues are called **protein tyrosine kinases**. These enzymes play crucial roles in signal transduction and regulation of cell growth.

Proto-oncogenes are cellular genes that regulate growth control. When mutated or aberrantly expressed, they can contribute to malignant transformation of cells leading to cancer.

P-selectin: see **selectins**.

Purine nucleotide phophorylase deficiency is an enzyme defect that results in severe combined immunodeficiency (SCID). This enzyme is important in purine metabolism, and its deficiency causes accumulation of purine nucleosides which are toxic for developing T cells, causing the immune deficiency.

Radiation bone marrow chimeras are mice that have been heavily irradiated and then reconstituted with bone marrow cells of a different strain of mouse, so that the lymphocytes differ genetically from the environment in which they develop. Such chimeric mice have been important in studying lymphocyte development.

Antigen:antibody interaction can be studied by **radioimmunoassay (RIA)** in which antigen or antibody is labeled with